the plurality of option characteristics includes a strike price, a trade date, and an expiration date;
the plurality of underlying instrument characteristics includes a market price for the underlying instrument; and
the processing facility is further operable to determine a relative reference value for each option in the plurality of options by calculating a relative strike price based on the strike price of each option, the market price of the underlying instrument and additional data such as time until expiration.

72. (New) The computer system of claim 68, that is operable to identify the options having the relative reference value satisfying the reference criteria:
by identifying the options having that reference value or
by identifying the options in a range of specified reference values or
by calculating an interpolated or extrapolated value that satisfies the specified reference value based on relevant option characteristics in the database.

73. (New) The computer system of Claim 70, that is operable to create reports that have as one of the variables mathematical functions of the characteristics of the identified options.

74. (New) The computer system of Claim 66, wherein:
the plurality of option characteristics includes a trade date and an absolute expiration date; and
the processing facility is further operable to determine the relative reference value for each option by calculating a relative expiration date for each option based on the trade date and the absolute expiration date.

REMARKS – General

By the above amendment, Applicants have amended the title to emphasize the novelty of the invention.

Also, applicants have rewritten all claims to define the invention more particularly and distinctly so as to overcome the rejections and define the invention patentably over the prior art.

The Rejection of Claims 1 and 29 on May is Overcome
The last O.A. rejected independent claims 1 and 29 on May referring to 35 USC §102. Claims 1 and 29 have been rewritten as Claims 57 and 66, respectively, to define patentably over this reference. May (Patent 6,421,653) teaches methods and computer programs for electronic trading of derivatives where counterparty credit risk is important to participants. Applicants request reconsideration of this rejection, as now applicable to claims 57 and 66, for the following reasons:

1. Neither May nor any other prior art teach a means to determine relative reference value(s) for each option in a plurality of options.
2. Neither May nor any other prior art teach a means to retrieve option data from a database using relative reference criteria for the purpose of historical data analysis.
3. Even if May contained the features of determining relative reference values and having a means to retrieve data based on said criteria, §102 provides for identical devices having different purposes to be novel.
4. These novel features of new claims 57 and 66 produce new and unexpected results and hence are unobvious and patentable over this reference.

Neither May Nor Any Other Prior Art Teach a Means to Determine Relative Reference Value(s) For Each Option In a Plurality of Options
Both Claims 1 and 29 have been rewritten as referring specifically to options and to historical analysis. Applicants, May and other prior art include facilities for storing option and underlying characteristics in a database. However, only applicants teach a means to determine "one or more relative reference value(s) for each option in the plurality of options, said relative reference value(s) being a function of one or more characteristic(s) of the option and one or more analysis characteristic(s)." That is, the applicants teach adding calculated fields (functions) to the database that are determined using inputs that include at least one characteristic of the option and at least one additional piece of data. This new field becomes a new characteristic of every option – a reference value that is used for querying.

The last O.A. stated that May includes a means to determine a relative reference value for each derivative in the plurality of derivatives and referred to Fig. 12, 290 and 292 (p. 2 of O.A.). Figure 12 of May shows a Market Entry Interface for the purpose of monitoring current markets and executing trades. Item 290 is a menu bar that provides different trading (i.e., non-analysis) functions. Item 292 is a particular button on 290 that brings up a new interface showing market depth for the indicated security (that is, those bids that are below the best bid and those offerings above the best offer price) (Col 36, lines 45-51). The other buttons provide mechanisms for performing trading related functions. The descriptions can be found in Col 35, 19-64. None of these provides a means to determine relative reference values.

Further review of May in regard to options and their relative reference characteristics shows that there is only brief mention of any option characteristics. May mentions option characteristics in Col 20, lines 10-36 and in Table 1. "STRIKE: The STRIKE parameter indicates the cap or swaption's exercise rate or price set on the option. Any strike defined in the symbol as ATM (at-the-money) will be shown as such in this parameter. In such a case, the percentage or strike will be agreed through the term negotiated process discussed below." Table 1 paraphrases the this passage.

May allows for certain not yet existing option securities to be specified as ATM (at-the-money) in their symbol protocol, which is a narrow relative reference criterion. However, May does not teach giving relative reference criteria to every option in the plurality of options, which is a distinguishing difference between May and the current invention. Having relative reference criteria for all of the options in the database is a critical piece of what provides for the applicants' invention's new and unexpected results as detailed below.

An additional point regarding May's single mention of ATM is that it only applies to options that do not yet exist. That is, they can only be quoted as ATM; they can not be contracted or referenced after trading as ATM. Once a trade is negotiated, the option is no longer ATM. Instead, it has specified (absolute) strike, e.g., a swap capped at 5%. This is necessary to create terms for the contract between the two parties. Once completed, May's symbol protocol would refer to that option using the absolute strike as it will not stay ATM. Therefore, for options that already "exist" or have already traded, there is no facility in May for utilizing relative reference criteria.

Neither May nor any other prior art teach a means to retrieve option data from a database using relative reference criteria for the purpose of historical data analysis

Neither May, the other references noted by the Examiner or other known prior art reveals any means or system for querying an historical options database using relative reference criteria. In particular, a review of the figures and text of May does not give any reference to capabilities for obtaining ranges of dates for data retrieval. The updated claims 57 and 66 have had the term "historical" added to explicitly show the novelty of the Applicants' invention. It is clearly necessary to be able to specify in some capacity start and end dates for data retrieval when using historical data. These dates may be assumed by the method or system, e.g., retrieving all available data. Again, there is no mention of any such capability in May.

The only stated method for retrieving data in May is using the symbol protocol. That protocol was designed to return exactly one security. To do otherwise would be problematic for a trading system. If the system designated more than one security using the same symbol, there would be confusion in the trading of those securities. Such confusion would be costly to participants and is clearly antithetical to all trading systems and specifically the May invention. The Applicants have provided a method and system for using criteria which can return different securities from the same query. A simple example is that the at-the-money call might be struck at 50 one day and 55 the subsequent day. Using our system and specifying to retrieve the at-the-money call for those two days would provide the requested data for the 50 call on the first day and the 55 call on the second. This is exactly the relative reference that is the crux of the invention.

Additionally, the O.A. omitted any mention of May's teaching "selecting reference criteria for evaluating the options; and identifying each option having a relative reference value satisfying the reference criteria" as stated in original Claims 1 and 29. Claim 1 is covered in the second paragraph of the O.A. on page 2 in section 1. While mention is made (and disputed above) regarding the other parts of Claim 1, these last two critical parts of Claim 1 are omitted and the subsequent paragraph begins the review of claims 2-4.

Even if May contained the features of determining relative reference values and having a means to retrieve data based on said criteria, §102 provides for identical devices having different purposes to be novel
The two inventions differ in purpose. §102 allows for two inventions that would otherwise be indistinguishable to both be patentable if a new usage is given for the latter application. The purpose of the current invention is to provide a new method and computer system of analyzing option market data. The method's current preferred embodiments are meant to translate absolute strikes and expiration dates to a relative frame of reference matching market participants' needs. In particular, the preferred embodiment provides access to option market data based on different metrics of option money-ness, or deviation of the strike price from the underlying market price, and time until expiration. Whereas, May states that the objects of that invention are all for the trading of derivatives (Col 5, lines 29 – 63). Furthermore, there is nothing in the May specification to suggest the invention assists traders in the estimation of how the relevant securities should be valued, i.e., perform analysis.

One can think of the two as complementary but distinct tools. The Applicants provide a method and system for option data analysis. The analysis is used to make judgments prior to trading. Once a market assessment has been made, a trade can be executed. The trade can be executed using phone brokers or an invention such as that by May.

These novel features of new claims 57 and 66 produce new and unexpected results and hence are unobvious and patentable over this reference.
Although the groundbreaking Black-Scholes equation assumes that all options for a given underlying have the same implied volatility, the market has produced different results. That is, implied volatility varies by strike. How and why that variation occurs is of considerable interest to option traders and academics. The Applicants' invention provides a method and system for finding and measuring those relationships over time.

Amongst the new and unexpected results are:

- the ability to provide measurements of volatility skew and kurtosis; that is, measuring the variation of implied volatility between strikes of the same maturity
- the ability to compare such measurements between different underlying securities and across maturities
- the ability to monitor option pricing for spreads (combinations of options) that are based on relative reference. For example, the ATM call vs. two 110% OTM calls.
- the ability to examine option characteristics based on relative time periods, e.g., days until expiration

Financial services, in general, and option trading in particular are extremely competitive businesses. Traders are continually seeking advantages over other participants. Not only are the traders seeking advantages, but there are firms which provide traders with data services that are working to distinguish themselves from other such firms. These can be very well capitalized and aggressive firms such as Bloomberg LP, Reuters and Thomson Financial. It should be noted that event though the Chicago Board Options Exchange was founded in 1973, none of these firms nor others was able to deliver such a clearly sought product prior to Applicants.

This type of product has achieved commercial success. Unfortunately, it has not been the success of the Applicants due to lack of funding. However, after both the founding of Applicants' firm and filing of this patent application, at least two firms are in the business of supplying subsets of the capabilities of the Applicants' invention. These firms are iVolatility and OptionMetrics. Bloomberg LP has recently added similar capabilities into their "Professional Product."

The invention solves a long felt and unsolved need. Reviewing price charts is widely practiced by traders and the community has sought such data for option markets. In addition, prior to the invention, much of the historical option price action memory has been concentrated in the locals who make markets on those options. The invention provides other traders perspective in the markets they wish to trade so that those traders have a necessary level of knowledge to act. Risk managers have shown interest in the invention to properly margin traders and to gain insight into market activity.

The Dependent Claims Are A Fortiori Patentable Over May
New dependent claims 58 - 65 and 66 - 74 incorporate all of the subject matter of claims 57 and 66 and add additional subject matter which makes them a fortiori and independently patentable over the reference.

Claims 60 and 69 require the calculation of an implied volatility for each option in the database. These represent prior claims 8 and 36. Claim 8 is meant to be addressed in paragraph 2 on page 3 of the O.A. However, discussion is omitted and the next paragraph begins with claims 9-11. Claims 29-56 are addressed in a single paragraph on page 4. May does not discuss implied volatility, how to calculate it or the storage of implied volatilities in a database.

Claim 62 replaces prior claim 12. Likewise claim 71 replaces prior claim 40. These claims describe a particular relative reference. It describes relative strike using the option strike, the underlying security price and additional data, i.e., expiration date. The O.A., in the last paragraph on page 3 and continuing on page 4, states that May teaches the step of determining a relative reference value for each derivative in a plurality of time increments based on the strike price of the option and the underlying. As discussed above, May does not teach a means of determining a relative strike price based on actual strike, underlying price and other variables. Instead, he provides a way for referring to quoted, but not yet traded options as ATM. This is a particular designation, not a relative strike. A relative strike would be 110% of spot or $10 greater or some other function of strike, underlying and, possibly, other variables. Furthermore, once the contract is traded, it is specified as a particular strike not a relative strike. There is no designation for previously traded contracts to be specified using a relative strike. And there is no mention or method for retrieving such prices for arbitrary or multiple time increments.

Claim 65 replaces prior claim 24. Likewise, claim 74 replaces prior claim 52. These claims specify relative expirations, e.g., days till expiration. The O.A. in paragraph 2 on page 4 states that May has all of the features of the invention as per claims 20-28 and refers to col. 36, lines 4-19. This section of the May specification addresses order entry, i.e., commands to purchase or sell securities. This section does not refer to derivative characteristics. "The user enters a price, quantity, and selects how long the order will be good." (Col. 36, line 4). May goes on to describe different order types: good until logout, good until time and good until cancelled. These are clearly not derivative or option characteristics. Rather, they are characteristics of an order.

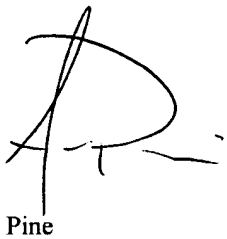
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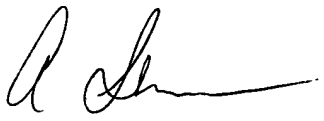
For all of the above reasons, applicants submit that the specification and claims are now in proper form and that the claims all define patentably over the prior art. Therefore, they submit that this application is now in condition for allowance, which action they respectfully solicit.

Conditional Request for Constructive Assistance

Applicants have amended the specification and claims of this application so they are proper, definite and define novel structure which is also unobvious. If, for any reason, this application is not believed to be in full condition for allowance, applicants respectfully request the constructive assistance and suggestions of the Examiner pursuant to M.P.E.P. § 2173.02 and § 707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Very respectfully,





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15 DECEMBER 2003



ARI PINE APPLICANT